

ATOMIC LAYER CRYSTAL DEPOSITION METHOD AND DEVICE

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Abstract

PURPOSE: To improve the adsorption efficiency at low temperature thereby enabling the title atomic layer crystal deposition of a compound semiconductor conventionally unrealizable to be made feasible by a method wherein at least one alkyl radical coupler coupled with a metal before the molecules to be deposited reach a substrate is thermal-dissociated to be fed to the substrate to be deposited using the alkyl radical molecules.

CONSTITUTION: $(\text{CH}_3)_3\text{Al}$ having the self deposition stopping function passes through a quartz tube 3 to be thermal-dissociated into $-(\text{CH}_3)_2\text{Al}$, $-(\text{CH}_3)\text{A}$ -, Al atoms. At this time, the Al atoms stick to the inner wall of the quartz tube 3 while the couplers of $-(\text{CH}_3)_2\text{Al}$ are coupled with hydrogen to be a stable $\text{H}(\text{CH}_3)_2\text{Al}$ compound. On the other hand, $-\text{CH}_3\text{Al}$ - is also coupled with hydrogen atoms but to be so unstable compound that $-\text{CH}_3\text{Al}$ may be changed into $\text{H}(\text{CH}_3)_2\text{Al}$. Accordingly, the hydrogen of the $(\text{CH}_3)_2\text{Al}$ reaching the substrate 7 surface is dissociated when Al reacts to As on the substrate surface so that Al and As may be easily coupled with each other into a compound at relatively low temperature. Through these procedures, the title atomic layer crystal deposition of a compound semiconductor conventionally unrealizable can be made feasible.